Access to GOES Satellite Data

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Since the start of the NOAA Geostationary Operational Environmental Satellite (GOES) program in the United States, one of the main challenges has been the ingest, archival, and subsequent use of the data. As technology and equipment have changed over the years, the storage media has changed from videotapes and hardcopy printouts to mass storage devices and high capacity tape drives.

This presentation will address the various archives and projects directed at archiving GOES data sets and the best ways for researchers to obtain the data sets. The basic data formats available from the archives will be explained briefly in the context that they relate to the type of software which will be used. Use of NOAA's GOES data has been widespread in recent radiation experiments. Further, NOAA has developed a special data archive at the National Geophysical Data Center in Boulder, CO which contains data sets from the Space Environment Monitoring instruments aboard the GOES satellites.

Currently, NOAA's requirements for the next generation of satellites are being gathered from users such as the national weather service and military services in addition to the wider user community. Plans are revised and updated on a yearly basis and presented at the national American Meteorological Society meetings held each January. Of particular interest this year was the use and exploitation of the GOES sounder data. The GOES sounder produces data in 19 different spectral bands and can be used to create vertical profiles in non-cloudy regions in addition to the images like those produced from the 5 spectral band imager.

An Overview of GOES Satellite Data Availability

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Outline

- Retrospective Data
  - National Archives, Pathfinder, Others
- Real-time Data Access
  - Direct Readout, Data Distributors, Internet Sources
- Software
- Summary

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Retrospective Data in National Archives

(raw data)

- National Climatic Data Center (www.ncdc.noaa.gov)
  - GOES - Geostationary Satellite Archive System (www.ssec.wisc.edu/gsas/)
    - **Holdings: GOES E/W, 1978 to present; global 1978-1979**
    - **Data format: GARS (McIDAS AREA)**
    - **Cost: $75 per scene from NCDC; $16 per image via McIDAS system**
    - **Software: McIDAS, MERLIN, GEMPAK, WXP, VIS-5D, VIA-AD, etc.**
  - AVHRR - Satellite Active Archive (www.saa.noaa.gov)
    - **Holdings: Global coverage, March 1, 1994 to present**
    - **Data format: NOAA/NESDIS Level 1B**
    - **Cost: 10 Mbyte data set free**
    - **Software: GeoVu data browser from NGDC**
      http://apex.ngdc.noaa.gov/seg/geovu/geovu.shtml

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Retrospective Data Pathfinder Products

- GOES - Univ. of Wisconsin (GOESPRODS@SSEC.WISC.EDU)
  - Radiances
    - **Holdings: hourly, May 1987- Nov 1988**
    - **Data format: 26 Mbytes/image in McIDAS AREA format, GIF browse**
    - **Cost: free**
    - **Software: McIDAS, MERLIN**
- AVHRR - NASA/GSFC (xtreme.gsfc.nasa.gov)
  - **Holdings: July 1981 to present**
  - **Data Format: 228 Mbytes/image in HDF**
  - **Cost: Free or Min. cost of reproduction**
  - **Software: ftp.ncsa.uiuc.edu/HDF**

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Retrospective Data GCIP Data

- GEWEX Continental International Project (GCIP) Satellite Data Source Module
  (http://wwwghrc.msfc.nasa.gov/gcip/sdsm.html)
  - Long list of satellite data and products and related efforts
  - Radiation Projects (DOE ARM, NASA ISCCP, NASA EOS, etc.)
  - Hydrology/land surface projects
  - Numerous links to other resources

Real-time Data Access by Direct Readout

- Telonics, Inc.
  932 E. Impala Avenue
  Mesa, AZ 85204-6699
  (602) 892-4444
- Hughes Information Technology Company
  16800 Centretech Parkway
  Aurora, CO 80011-9046
  (303) 344-6000
- Global Imaging
  201 Lomas Santa Fe Drive
  Suite 380
  Solana Beach, CA 92075
  (619) 481-5750

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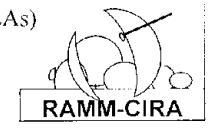
Real-time Data Access
Data Distributors

- UW-Madison Space Science and Engineering Center (SSEC)
- UNIDATA (NSF-UCAR)
- RAMSDIS (NOAA-NESDIS/RAMM/CIRA/CSU)
- NOAAPORT (NWS data broadcast -remapped satellite)
- Commercial Sources/Vendors
  - WSI, Alden, DTN/Kavouras, Hughes, Harris, Terascan
- Internet Sources/Servers
  - http://wwwghcc.msfc.nasa.gov/GOES/ (GIFs & AREAs)



Real-time Data Access

UW-Madison Space Science and Engineering Center (SSEC)

- Databases (www.ssec.wisc.edu/operations)
  - Global Satellite (GOES, GMS, Meteosat, and Polar/POES)
  - Conventional Meteorological data (current and archived)
  - GOES Archive (1978 to present)
- Access through McIDAS software and data feeds
- Data Costs
  - Approximately $0.75/Mbyte

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Real-time Data Access

UNIDATA (NSF-UCAR)

- Serves the University Community (www.unidata.ucar.edu)
  - Software
    - **McIDAS**
    - **GEMPAK**
    - **WXP**
  - Data (North America)
    - **NWS Family of Services**
    - **Wisconsin Satellite/Internet Broadcast**
  - Cost - free to UNIDATA members

Real-time Data Access

(RAMSDIS NESDIS-RAMMT-CIRA-CSU)

- RAMM Advanced Meteorological Satellite Demonstration and Interpretation System (www.cira.colostate.edu)
  - Demonstrate the value of digital satellite data for the NWS
  - Software: McIDAS-OS/2 based with special applications
  - Data:
    - Real-time satellite and conventional
    - Customized to site (48 image/graphic loops)
  - Cost: none to NWS. Low-cost PC-based option.

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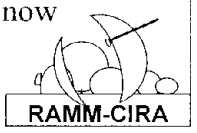
Realtime Data Access

(NOAAPORT)

- NOAA's 5-channel data distribution service to AWIPS sites
- Products tailored to NWS sites
- Software: commercially available
- Data: remapped satellite and conventional data/products
- Cost: data delivery is free but ground station and software needed initally. "AWIPS Lite" now commercially available.



GOES Space Environment Monitoring

- National Geophysical Data Center (www.ngdc.noaa.gov)
  - Boulder, CO
  - SEM URL http://julius.ngdc.noaa.gov:8080/production/html/GOES/index.html
  - Solar and sun activity data http://www.ngdc.noaa.gov/stp/stp.html

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Summary

- GOES data now take on many forms (graphic images, counts, calibrated radiances, etc.)
- Most data are served in real-time on the internet at no cost
- Archived data tend to be expensive
- Utilize DOE, NOAA, NASA, and other agency projects to obtain access to suitable data sets
- Experience has shown that established software packages that offer support and compatible data formats lead to the most productive users.

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